Claims

1. An interventional device, comprising:
a sonoluminescent light module for placement inside a body.

2. The interventional device of claim 1 wherein the sonoluminescent light module comprises:
a housing;
an acoustic transducer; and
an acoustic conducting medium disposed inside the housing and adjacent the acoustic transducer.

3. The interventional device of claim 2 wherein the acoustic transducer comprises a piezoelectric material and a wave matching layer.

4. The interventional device of claim 2 wherein the light module further comprises a lens disposed between the acoustic transducer and the acoustic conducting medium, thereby focusing sound waves generated by the acoustic transducer in the acoustic conducting medium.

5. The interventional device of claim 2 wherein a distal end of the housing is shaped to provide reflection and concentration of sound waves in the acoustic conducting medium.

6. The interventional device of claim 2 wherein a distal end of the housing is open to focus sound waves in the tissue.

7. The interventional device of claim 2 wherein the acoustic conducting medium comprises water.

8. The interventional device of claim 2 wherein the acoustic conducting medium comprises a solid substance or target on which sonoluminescent effect can be observed.

9. The interventional device of claim 3 wherein the piezoelectric material comprises lead zirconate-titanate.

10. The interventional device of claim 1 wherein the sonoluminescent light module is disposed near a distal end of the interventional device.

11. The interventional device of claim 10 further comprising a pulse generator in communication with the sonoluminescent light module through electrical conduits positioned inside the interventional device.

12. The interventional device of claim 2 wherein the sonoluminescent light module is disposed near a distal end of the interventional device and the distal end of the interventional device performs as the housing.

13. The interventional device of claim 10 wherein at least a portion of the interventional device comprises an optically transparent material.

14. The interventional device of claim 13 wherein a position of the light module inside the interventional device is adjustable.

15. The interventional device of claim 10 wherein the interventional device has an optically transparent window comprising a material selected to transmit light having a predetermined wavelength.

16. An interventional device, comprising:
an x-ray generating light source for placement inside a body.

17. The interventional device of claim 16 wherein the x-ray generating light source comprises a sonoluminescent light source.

18. A method for generating light inside a body comprising:
placing a distal end of an interventional device which includes a sonoluminescent light source inside the body, the light source comprising an acoustic transducer and an acoustic conducting medium;
providing a series of high voltage pulses to the light source, thereby generating sound waves; and
focusing the generated sound waves in the acoustic conducting medium, thereby generating light.

19. The method of claim 18 wherein the light generated comprises x-ray light.

20. An interventional device, comprising:
an arc lamp for placement inside a body.

21. The interventional device of claim 20 wherein the arc lamp comprises:
a housing, and
a first and a second electrode positioned inside the housing and in relation to each other to strike an arc.

22. The interventional device of claim 21 wherein the first electrode has a hemisphere shape and is coated with a metal.

23. The interventional device of claim 21 wherein the second electrode is formed on an inner surface of the housing by flash metallization.

24. The interventional device of claim 21 wherein the first and the second electrode are sealed inside the housing with sintered metal and a seal material that yields under high pressure.

25. The interventional device of claim 24 wherein the sintered metal comprises copper wool.

26. The interventional device of claim 20 wherein a distal end of the housing is dome shaped for collecting and redirecting light generated by the arc lamp.

27. The interventional device of claim 21 wherein a material for the housing comprises quartz.

28. The interventional device of claim 21 further comprising a feedback system and a light guide disposed adjacent a housing wall for supplying light output to a feedback system.

29. The interventional device of claim 20 wherein the arc lamp is positioned near a distal end of the interventional device.

30. The interventional device of claim 29 wherein the distal end of the interventional device performs as the housing.

31. A method for generating modular photonic energy inside a body, comprising:
placing a distal end of an interventional device which includes an arc lamp inside the body;
applying gradually increasing voltage to the arc lamp to strike an arc; and
quickly dropping the voltage applied to the arc lamp to sustain the arc generated.

32. An interventional device, comprising:
a fluorescent light source for placement inside a body.

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33. The interventional device of claim 32 wherein the fluorescent light source comprises a flash tube coated with a phosphorescent or fluorescing material.

34. The interventional device of claim 32 wherein the fluorescent light source comprises an equipotential flash tube shaped to discharge uniformly.

35. The interventional device of claim 34 wherein the fluorescent light source further comprises a dielectric material surrounding the flash tube and a pair of electrodes disposed at opposite sides of the dielectric material.

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36. The interventional device of claim 32 wherein the fluorescent light source is placed near a distal end of the interventional device.

37. The interventional device of claim 36 comprising a balloon catheter having a polymeric stent placed on an external surface of a balloon portion.

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38. The interventional device of claim 37 wherein the polymeric stent becomes hardened when exposed to radiation generated by the fluorescent light source.

39. The interventional device of claim 38 wherein the polymeric stent comprises a ultraviolet curable epoxy or adhesive material.

40. The interventional device of claim 32 wherein the fluorescent light source comprises:
a Gunn-effect diode for generating radio-frequency energy;
a dielectric resonator disposed adjacent the diode; and
a gas tube comprising a gaseous substance that fluoresce when subjected to RF energy.

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41. An interventional device, comprising:
a spark gap module for placement inside a body.

42. The interventional device of claim 41 wherein the spark gap comprises two electrodes positioned in relation to each other for generating a spark across a gap between the two electrodes.

43. The interventional device of claim 42 wherein the two electrodes are sealed in a transparent housing.

44. The interventional device of claim 43 further comprising a filter disposed at a distal end of the housing for enhancing a desired light output.

45. A method for performing spectral analysis of tissue, comprising:
placing a distal end of an interventional device which includes a spark gap module inside a body near the tissue;
supplying a voltage pulse to the spark gap module, thereby generating a spark; and
exciting the tissue with the generated spark; and
characterizing the tissue based on the excitation.

46. The method of claim 45 wherein
exciting the tissue comprises exciting fluorophors which may be present in the tissue; and
characterizing the tissue comprises detecting the presence of fluorophors in the tissue.

47. An interventional device, comprising:
an incandescent lamp for placement inside a body and for generating short duration high intensity light waves.

48. The interventional device of claim 47 wherein short duration comprises duration of less than 100 milliseconds.

49. The interventional device of claim 47 wherein the incandescent lamp comprises a housing, a pair of electrodes placed inside the housing and a filament connecting the pair of electrodes.

50. The interventional device of claim 49 wherein the filament comprises an oxidizing filament and the housing is filled with a selected gas for generating light having a pre-determined color.

51. A method for generating modular photonic energy, comprising:
placing a distal end of an interventional device which includes an incandescent lamp inside a body; and
passing electric pulses to the incandescent lamp, thereby generating short duration light waves.

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